

# **EXHIBIT 87**

IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF GEORGIA  
ATLANTA DIVISION

DONNA CURLING, ET AL.,	:	
	:	
PLAINTIFFS,	:	
vs.	:	DOCKET NUMBER
	:	1:17-CV-2989-AT
BRAD RAFFENSPERGER, ET AL.,	:	
	:	
DEFENDANTS.	:	

TRANSCRIPT OF HEARING ON PRELIMINARY INJUNCTION VIA ZOOM

PROCEEDINGS

BEFORE THE HONORABLE AMY TOTENBERG

UNITED STATES DISTRICT JUDGE

SEPTEMBER 10, 2020

1:00 P.M.

VOLUME 1

REDACTED

**MECHANICAL STENOGRAPHY OF PROCEEDINGS AND COMPUTER-AIDED**

**TRANSCRIPT PRODUCED BY:**

<b>OFFICIAL COURT REPORTER:</b>	<b>SHANNON R. WELCH, RMR, CRR</b>
	<b>2394 UNITED STATES COURTHOUSE</b>
	<b>75 TED TURNER DRIVE, SOUTHWEST</b>
	<b>ATLANTA, GEORGIA 30303</b>
	<b>(404) 215-1383</b>

UNITED STATES DISTRICT COURT  
OFFICIAL CERTIFIED TRANSCRIPT

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1 California on matters related to election security, as well as  
2 the election commissions of Nigeria, Mongolia, and Denmark.

3 I was asked to co-author a manual or report on election  
4 forensics for the Venice Commission of the Council of Europe.  
5 A number of other things.

6 **Q.** Thank you.

7 MR. BROWN: Your Honor, I would tender Dr. Philip  
8 Stark as an expert in the fields of election auditing and  
9 election security.

10 THE COURT: Any objection? Is there any objection?

11 MR. MILLER: I apologize. This is Carey Miller. We  
12 were unmuting. We are readjusting for our Zoom issues.

13 I -- the State defendants would assert an objection  
14 to the extent that the expertise of Dr. Stark is being offered  
15 for. It goes beyond the concept of auditing.

16 And if Your Honor would prefer, we can conduct a voir  
17 dire at this point or subsequent in our cross-examination.  
18 That is perfectly fine too.

19 THE COURT: You can do it later.

20 MR. MILLER: Thank you.

21 **Q. (BY MR. BROWN)** Dr. Stark, have you developed an opinion  
22 on whether BMDs, like the BMDs used in Georgia, guarantee a  
23 transparent, fair, accurate, and verifiable election?

24 **A.** Yes. They do not.

25 **Q.** And in general terms, why don't they?

1     **A.**     Introducing electronics between the voter and the paper  
2     record in effect makes the paper record hackable. The machines  
3     themselves are vulnerable to misconfiguration, software bugs,  
4     and hacking.

5             Evidence is that the vast majority of voters do not notice  
6     errors in the BMD printout. Those who do have no mechanism by  
7     which they can cry foul and prove to a poll worker or election  
8     official or anybody else that there was, in fact, a  
9     malfunction, that the ballot-marking device didn't do what it  
10    was supposed to do.

11            There is essentially no practical way to detect hacking of  
12    ballot-marking devices. And as a result, the paper record  
13    produced by ballot-marking devices is not a trustworthy record  
14    of voter intent.

15    **Q.**     Dr. Stark, you may have heard in the opening that counsel  
16    for the State asserted that Georgia was going to do a  
17    risk-limiting audit of these elections.

18            And I want to ask you: Would a risk-limiting audit of  
19    these elections be effective and, if they are effective, what  
20    would they show or not show?

21    **A.**     If they were to conduct a genuine risk-limiting audit  
22    including a compliance audit to ensure that the chain of  
23    custody of the paper hadn't been broken, that the paper trail  
24    is as it was when it was cast by the voters, all that a  
25    risk-limiting audit could accomplish is to confirm that the

1 whole manual tabulation of the paper record would give the same  
2 winner or winners as the electronic tabulation of that paper  
3 record did. It would do nothing to detect or correct any  
4 problems in the generation of that paper record by the  
5 ballot-marking devices.

6 To the extent that ballot-marking devices misprinted  
7 voters' intentions, there is nothing that a risk-limiting audit  
8 could do to detect that or recover from it.

9 **Q.** Dr. Stark, you mentioned vulnerability. Does your opinion  
10 about the efficacy of a risk-limiting audit depend upon the  
11 degree of vulnerability that the Court might find that the  
12 Georgia system is subjected to?

13 **A.** Unless there were a way to guarantee that every single BMD  
14 printout was correct, that it correctly reflected what was  
15 shown to the voter on the screen or spoken into the voter over  
16 the audio interface, then there is a problem that cannot be  
17 rectified by any kind of auditing.

18 So provided they are not perfect, this problem exists.  
19 The materiality of the problem is going to depend on the number  
20 of voters who vote using ballot-marking devices.

21 **Q.** Dr. Stark, the evidence will show that there is some --  
22 there's studies that have been conducted that show that some  
23 voters do, in fact, verify their ballots.

24 Why isn't that enough to either be a random kind of  
25 sampling or enough to alert officials there might be a problem?

1     **A.**     There are several questions wrapped up in that. I'll try  
2     to untangle it.

3             So first of all, some voters noticing that there was an  
4     error in the printout and requesting a fresh opportunity to  
5     mark a ballot does nothing for the voters who didn't check or  
6     didn't request a fresh opportunity. So it only corrects those  
7     votes where the errors were caught.

8             Secondly, the number of voters who would request a fresh  
9     opportunity to mark a ballot may be very, very small.  
10    Certainly not enough to arouse suspicion.

11            Conversely, if election officials were willing to take  
12    voters' assertions that the device misbehaved as proof that the  
13    device misbehaved, the only recourse would be to hold a new  
14    election. There is no way to go back and figure out which  
15    votes were affected, how many votes were affected, and what the  
16    correct outcome of the contest should have been.

17    **Q.**     Dr. Stark, is there some kind of pre-election testing  
18    though that the State could conduct that would ensure that the  
19    BMDs don't misbehave in such a manner?

20    **A.**     There is pre-election testing that the State should  
21    conduct routinely, logic and accuracy testing. But that  
22    testing can generally only detect gross misprogramming errors,  
23    gross configuration errors.

24            There is no way that it can suffice to show that on  
25    election day the devices do not alter enough votes to change

1 the electoral outcome of one or more contests.

2 **Q.** I also heard the assertion that, you know, a BMD printout  
3 is in English, the voter is free to verify it.

4 How can there be question of voter intent if the voter has  
5 that opportunity?

6 **A.** Well, again, there's several issues there. BMD, kind of  
7 by its nature, erases all direct evidence of voter intent.  
8 There's no way to tell from a BMD printout what the voter  
9 actually saw on the screen, what the voter did with the device,  
10 what the voter heard through the audio interface. So it really  
11 becomes trusting the computer at that point.

12 Yes, the ballots are printed in English. Ballots in  
13 Georgia, ballots in California are quite long. They typically  
14 vote on very many things. I understand that in the primary  
15 this summer there were something like 29 issues to vote on in  
16 Fulton County, if I'm recalling correctly.

17 The evidence is that most voters don't check, that those  
18 who do check often miss problems that are actually there. And  
19 I personally would not be able to recall how I voted on 29  
20 different things without using a sample ballot or some kind of  
21 paper record of what -- how I intended to vote.

22 **Q.** I want to focus your attention on: Of the few voters who  
23 might check their ballot and the fewer still who might check --  
24 detect an error, if they go to a poll worker, what are the poll  
25 workers' options?

1     **A.**     Well, in most states -- and I assume in Georgia as well --  
2     the poll worker should give the voter a fresh, unmarked ballot  
3     to have a do-over, to mark the ballot again, or mark a fresh  
4     piece of paper.

5             The -- the poll worker or the election official is really  
6     in a bind because there is no way for an election official to  
7     tell whether when a voter requests a new opportunity to vote it  
8     is because the voter made a mistake, the machine malfunctioned,  
9     or the voter is just crying wolf and trying to cast out on the  
10    outcome of the election.

11            The fundamental problem with ballot marking or a  
12    fundamental problem with ballot-marking devices is that they  
13    make voters responsible for the security of the system but  
14    don't provide the voters with evidence that the voters can then  
15    show anyone else to demonstrate that this was a problem.

16    **Q.**     Dr. Stark, have you looked at the issue of how many hacks  
17    would be necessary to go detected or undetected in an actual  
18    election given some assumptions about the number of voters who  
19    might detect that problem?

20    **A.**     Yes, sir. I prepared a demonstrative exhibit using as an  
21    example the Attorney General's conference -- I'm sorry --  
22    contest in Georgia in 2018.

23            MR. BROWN: And at this point, Your Honor, I would  
24    like to ask that Dr. Stark's Demonstrative Exhibit Number 1 be  
25    shared on the screen.

1 is less of a concern because you are talking about whether the  
2 voter properly marked it; is that right?

3 **A.** No, sir. That isn't an accurate reflection of my -- at  
4 least what I intended to say.

5 **Q.** Please correct me.

6 **A.** Whether a voter verifies his or her hand-marked paper  
7 ballot is up to the voter. And if a voter makes a mistake and  
8 doesn't correct that mistake, that is on the voter on some  
9 level.

10 In contrast, a voter can check a review screen on a  
11 ballot-marking device or listen to the audio output of a  
12 ballot-marking device. And yet what gets printed on the  
13 printout isn't necessarily what the voter saw, what the voter  
14 heard, or what the voter did. What is on a hand-marked paper  
15 ballot is necessarily what the voter did.

16 **Q.** Okay. And I believe I understand your --

17 THE COURT: Could you just take down the Florida  
18 recount because it is not helping our -- what we're trying to  
19 see here.

20 MR. MILLER: Your Honor, if I could have the witness  
21 read one sentence off of this.

22 THE COURT: You just read it. Read it aloud what you  
23 -- there is no point in --

24 MR. MILLER: Okay.

25 THE COURT: Read what you want to ask him about.

1 MR. BROWN: Objection, Your Honor. He was not  
2 finished with his answer. Again, we have --

3 MR. MILLER: Your Honor, I'm not trying to cut off  
4 the witness. But at some point this is a cross-examination  
5 with yes-or-no questions and not (unintelligible). I realize  
6 we are on Zoom, and I'm not trying to be difficult.

7 THE COURT: Let Professor Stark finish the answer if  
8 he hasn't.

9 THE WITNESS: Thank you, Your Honor. I actually  
10 don't remember what I was going to say.

11 THE COURT: All right. Go ahead, Mr. Miller.

12 **Q. (BY MR. MILLER)** On the exhibit you discussed in your  
13 direct testimony, you referred to a hack rate; correct?

14 **A.** Yes, sir.

15 **Q.** And just to be clear, that document was not produced in  
16 discovery; right?

17 **A.** That's correct.

18 **Q.** Was that document cited and included in your declaration?

19 **A.** No, sir.

20 **Q.** And so on those hack rates, you mentioned earlier you are  
21 unaware of any study as to hand-marked paper ballot  
22 verifiability.

23 How did you determine the hack rate relative to, say,  
24 50 percent of hand-marked paper ballots in your hypothetical?

25 **A.** In the hypothetical involving 50 percent hand-marked paper

1 ballots, the only votes that were changed were votes that were  
2 printed using ballot-marking devices. And I assume that there  
3 was no change to votes made on hand-marked ballots.

4 **Q.** So you just assumed that there was no issue with a  
5 hand-marked paper ballot; right?

6 **A.** No, sir. I assumed that electronic hacking can't change a  
7 hand-marked paper ballot.

8 **Q.** And would you agree with me that a hack with a pencil or  
9 pen could change a hand-marked paper ballot?

10 **A.** If there isn't a good chain of custody of ballots, if  
11 insiders can alter marks on ballots, then there is a problem,  
12 whether it is hand-marked paper ballot or ballot-marking device  
13 output.

14 **Q.** And that chain of custody becomes even more difficult when  
15 there is central tabulating scanners; correct?

16 THE COURT: When they are essential what?

17 MR. MILLER: I'm sorry. Central tabulating scanners.  
18 Central count scanners, for example, in Colorado.

19 **A.** I don't see why that would be the case.

20 **Q. (BY MR. MILLER)** And when the voter is not him or herself  
21 inserting the ballot into the scanner?

22 **A.** I don't think that that cuts one way rather than the  
23 other. The chain of custody of the ballots matters regardless  
24 of where the ballots are collected.

25 **Q.** And you have a couple of comments in the -- in your

1 declaration regarding the Fulton County pilot audit.

2 And just real briefly, you do understand that is a pilot;  
3 correct?

4 **A.** It clearly was a pilot, but it was not represented as a  
5 pilot by the Secretary of State's office.

6 **Q.** Would you agree with me that a press release is not the  
7 equivalent of binding state policy?

8 **A.** Sir, obviously, it is not binding state policy. But it  
9 was completely misleading. It said that it was a risk-limiting  
10 audit. It said that it could catch and correct errors. It  
11 said it validated the results. It said it followed best  
12 practices established by experts in election integrity. And it  
13 was none of those things.

14 **Q.** It was an example of trying to learn and work out the  
15 kinks of implementing best practices? Would you agree with me  
16 on that?

17 THE COURT: I really don't think this is helpful. I  
18 mean, you are arguing with the witness about an article -- an  
19 article about, I guess, the Secretary of State's office --

20 MR. MILLER: Your Honor, if I may, this is contained  
21 in his declaration.

22 THE COURT: I understand that. But I don't think it  
23 is going to materially make a difference to me. That is what  
24 I'm trying to tell you.

25 MR. MILLER: Your Honor, one last subject matter here

1 and I'll be done.

2 **Q. (BY MR. MILLER)** And I would ask that we put the screen  
3 share back on briefly.

4 Dr. Stark, can you see this on your screen?

5 **A.** Yes, sir.

6 **Q.** Okay. And do you see your name there at the top in the CC  
7 line?

8 **A.** I do.

9 **Q.** Okay. I just want to ask you just a few general  
10 questions.

11 Who is David Dill?

12 **A.** David Dill is a computer scientist formerly at Stanford  
13 University. He has gone to Facebook from Stanford. He was the  
14 founder of Verified Voting Foundation.

15 **Q.** And am I correct in assuming the other individuals on the  
16 email are associated with Verified Voting?

17 **A.** That would not be correct. It is true of some of them but  
18 not all of them.

19 **Q.** I understand. And so you yourself, Dr. Stark, are you  
20 affiliated with Verified Voting?

21 **A.** No longer. I was on the advisory board for some years,  
22 and I was on the board of directors for some years, and I  
23 resigned last year.

24 **Q.** And how about Barbara Simmons? Do you know if she is  
25 affiliated with Verified Voting?

1     **A.**    Yes.  Dr. Simons is the chair of the board of Verified  
2    Voting.

3     **Q.**    I apologize.  Thank you for correcting me on her name.  
4         Mr. Favorito, is he affiliated with Verified Voting?

5     **A.**    Not to the best of my knowledge.

6                 THE COURT:  Tell me where you are going, Mr. Miller,  
7    because right now you have gone longer than Mr. Brown.  So just  
8    tell me where you are going with this and how much longer are  
9    you going to be.

10                MR. MILLER:  Your Honor, the point as to this  
11   exhibit, which is the only piece of evidence that was produced  
12   in discovery, is that it demonstrates a disagreement, frankly,  
13   within the organization as to what a risk-limiting audit is.  
14   And it includes plaintiffs in this case.

15                THE COURT:  Ask him a point-blank question rather  
16   than -- why are we going through each of the individuals.  If  
17   you want to ask him, let him read the document and ask him a  
18   question about it or else --

19                MR. MILLER:  Yes, Your Honor.  I guess the basis is  
20   to form the foundation on the individuals listed here.  I will  
21   just ask him about two other individuals on this email chain if  
22   that is okay.

23                THE COURT:  Two.  I mean, I just don't really see the  
24   point.  But that is -- I'm not going to restrict you.  But I'm  
25   telling you at this point, you know, you have one minute to

1 this point is unreasonable.

2 **Q.** So any other individual that disagrees with you is  
3 unreasonable? But you have the exact testimony; right?

4 **A.** Well, on this particular issue, I did come up with the  
5 idea. The whole principle that it is supposed to fulfill, the  
6 whole point of the audit is that it has a large chance of  
7 correcting the reported outcome if the reported outcome is  
8 wrong. And everything flows from that.

9 So some people are trying to redefine it so that it only  
10 corrects some kinds of errors, so that it is fine to do it even  
11 on an untrustworthy paper trail. I don't think that that is  
12 the spirit of it. That is certainly not what I intended it to  
13 be. That is not what the papers say.

14 **MR. MILLER:** Thank you, Your Honor. No further  
15 questions.

16 **THE COURT:** Mr. Brown, do you have anything more?

17 **MR. BROWN:** I have one follow-up question.

18 **REDIRECT EXAMINATION**

19 **BY MR. BROWN:**

20 **Q.** Dr. Stark, putting aside your risk-limiting audit for the  
21 moment, do you know of any audit no matter how well conducted  
22 that could confirm this upcoming election in Georgia is  
23 accurate if Georgia does not replace the BMDs?

24 **A.** No, sir. There is no pre-election, during the election,  
25 or post-election process that can check whether BMDs altered

1 votes -- enough votes to change the outcome of the contest,  
2 even if the resulting paper were tabulated perfectly.

3 MR. BROWN: Thank you, sir.

4 THE COURT: All right. Let me just ask you one  
5 question, Dr. Stark.

6 EXAMINATION

7 BY THE COURT:

8 Q. When you were responding to the last questions that  
9 Mr. Miller was making about whether you found it -- whether you  
10 were right, whether they were right, I want to make sure I  
11 understand this. I mean, you had -- when you developed the  
12 concepts and principles of a risk-limiting audit, you indicated  
13 that this was a -- basically a whole paradigm development and  
14 construct of how it was done and you did this sort of as a  
15 mathematician and as a scientist, if I understand your prior  
16 affidavits and your resumes? Is that basically a fair summary,  
17 or am I missing something?

18 A. I apologize, Your Honor. But I didn't quite understand  
19 the question.

20 Q. All right. Well, my understanding -- I'm just looking --  
21 was that you are an expert on statistics, on mathematics, and  
22 you developed -- and that you developed the whole concept of  
23 principles around risk-limiting audits.

24 And is that correct?

25 A. Yes, Your Honor.

1     **A.**     So in that area in one of the locations, the ballot  
2     marking -- I arrived to the location because there was a report  
3     that there was irregularities in the ballot-marking device  
4     operations. I was told that the ballot-marking device produces  
5     test ballots.

6             And while I was observing, I saw a voter who went to scan  
7     their ballot. The poll worker -- after the machine rejected  
8     multiple times, the poll -- he sent the -- told that this is a  
9     test ballot. The voter went back with the test ballot and  
10    picked up the real ballot and returned the test ballot into the  
11    tray. So I observed that, and I didn't see the ballot, but I  
12    believe that the poll worker when -- when the poll worker said  
13    that this is a test ballot.

14    **Q.**     So you detailed that in other observations in your  
15    declaration; correct?

16    **A.**     Correct.

17    **Q.**     Okay. As far as your August 11 visit to Fulton County  
18    election center, are your observations in your declaration --  
19    does that substantially capture what you saw that day as well?

20    **A.**     Correct.

21    **Q.**     Okay. So, Mr. Hursti, I want to ask you: Based on your  
22    expertise and based on what you observed, the things that you  
23    have detailed in your declarations, do you have an opinion  
24    about whether the Dominion voting system using BMDs is capable  
25    of producing an accountable election result?

1     **A.**    Taking into account that I, as I detailed in the  
2     declarations, saw multiple different kinds of irregularities  
3     and an unexplained behavior, there is a serious doubt that the  
4     system was operating correctly. And in a theoretical level, as  
5     detailed already by Professor Stark, when you don't have an  
6     end-to-end chain of the voter's intent, when there is a system  
7     which can either maliciously or by honest error reproduce wrong  
8     kind of evidence, you don't have a capability of auditing.

9     **Q.**    Okay. So without a capability of auditing, can you trust  
10    the election results coming -- and without the chain of custody  
11    and other issues you have described, you know, can you trust  
12    the results coming out of the Dominion voting system?

13    **A.**    I personally would say I cannot trust it. And also this  
14    is not an election-specific issue. Any other industry, any  
15    other system with similar faults in those same areas would be  
16    equally untrustworthy.

17    **Q.**    Okay. In your opinion, specifically looking at this as an  
18    election system, as a voting system, is there a solution to the  
19    problem of the system's untrustworthiness?

20    **A.**    Yes, I believe there are. Based on the fact -- fact and  
21    observations and what I have gathered, the solution would be  
22    two-fold: First, moving to the hand-marked paper ballots. And  
23    in the case of a precinct in-person voting, the deficiencies of  
24    that scanner can be overcome by instructing voter carefully to  
25    vote and providing a pen, which will be known to be recorded

1 well by the scanner, what would be a black felt pen so that it  
2 gives no reflection. And at the same time, in home voting and  
3 email voting -- home voting and mail-in voting, the solution  
4 would be to use already existing scanners with more efficient  
5 way producing a higher quality, more information, retaining  
6 files to be used.

7 **Q.** Okay. So let me just break that down. Are you suggesting  
8 the continued use of the BMDs?

9 **A.** I am not suggesting the continued use of BMDs. I am  
10 strongly recommending to go to the hand-marked paper ballots  
11 for the reasons being that when the system in between cannot be  
12 trusted the chain of custody is broken.

13 **Q.** Okay. Let me ask you a question about scanners. Do you  
14 have an opinion whether the Dominion system's precinct and high  
15 volume scanners, the two different kinds of scanners, can be  
16 relied upon to accurately count all the votes?

17 **A.** Not at this current type of settings and the way they  
18 operate.

19 **Q.** Is that no, you don't have an opinion or no, they can't be  
20 trusted?

21 **A.** No, they can't be trusted under the current configuration  
22 and how they are currently being used.

23 **Q.** Okay. So is there a solution to that problem for the  
24 precinct scanners?

25 **A.** Yes, there is a solution. As I stated before, my opinion,

## C E R T I F I C A T E

UNITED STATES OF AMERICA

NORTHERN DISTRICT OF GEORGIA

I, SHANNON R. WELCH, RMR, CRR, Official Court Reporter of the United States District Court, for the Northern District of Georgia, Atlanta Division, do hereby certify that the foregoing 208 pages constitute a true transcript of proceedings had before the said Court, held in the City of Atlanta, Georgia, in the matter therein stated.

In testimony whereof, I hereunto set my hand on this, the 12th day of September, 2020.

*Shannon R. Welch*

SHANNON R. WELCH, RMR, CRR  
OFFICIAL COURT REPORTER  
UNITED STATES DISTRICT COURT

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